Manufacturing Growth in South Carolina:

A Detailed Examination, 2001-2008

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South Carolina Department of Commerce | Division of Research

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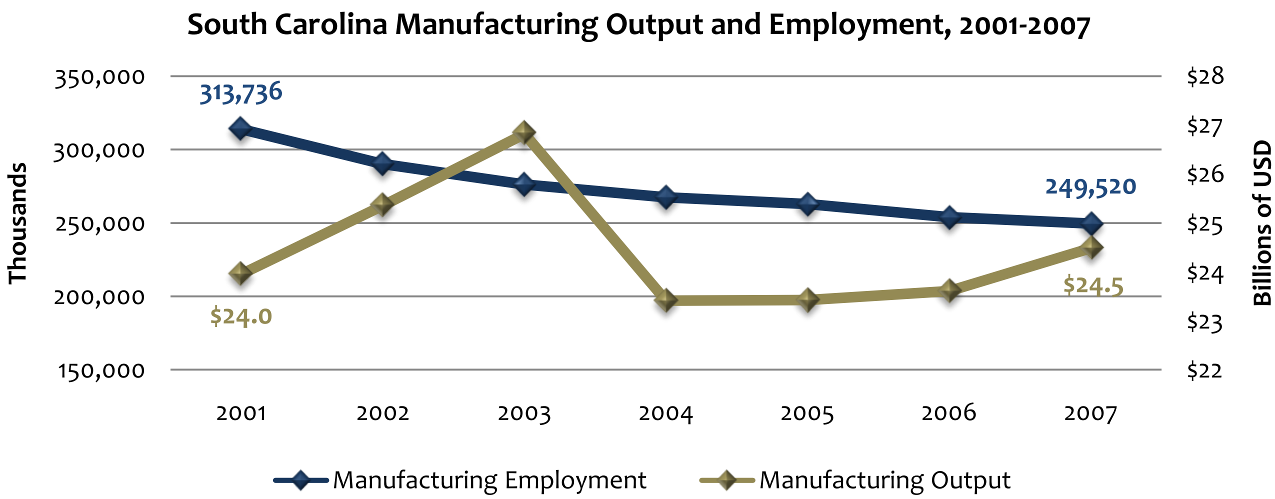
Executive Summary

Manufacturing in the United States and in South Carolina is an industry in transition. Rapid advancement in engineering, technology, and processes has caused manufacturing to evolve from an industry requiring intensive labor inputs to one that is increasingly capital-intensive.

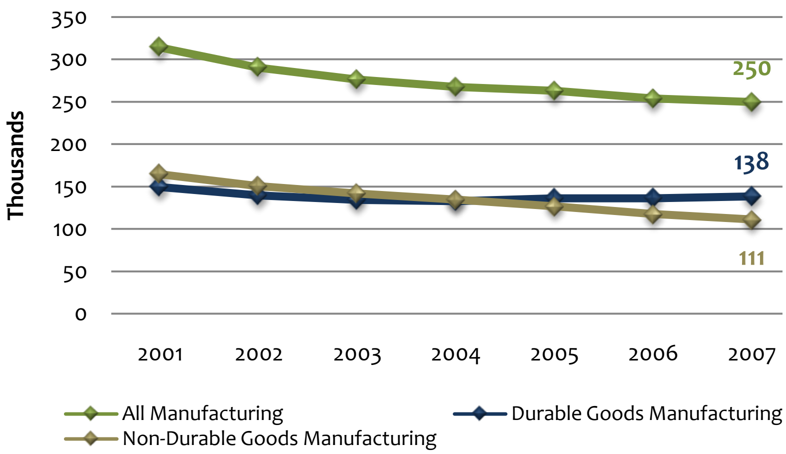


Sources: U.S. Department of Labor, Bureau of Labor Statistics and U.S. Department of Commerce, Bureau of Economic Analysis.

South Carolina's manufacturing industry experienced a 20% decline in employment yet a 2% gain in output from 2001 to 2007. These two metrics cannot, however, define the entirety of the dynamics within the industry. An in-depth analysis of manufacturing subsectors shows a growing technology-centric, capital-intensive industry requiring a smaller yet higher-skilled labor force. This finding is particularly evident in the durable goods sector, which produces goods that typically last for more than one year. Between 2001 and 2007, manufacturing exports represented over 95% of South Carolina's total exports. Manufacturers also invested over $11.8 billion in the state economy since 2006.

South Carolina's future manufacturing growth will continue the evolution toward capital intensiveness driven by technological progress. Consequently, high-skilled workers in knowledge-driven occupations will be in ever-increasing demand.

South Carolina Manufacturing Employment

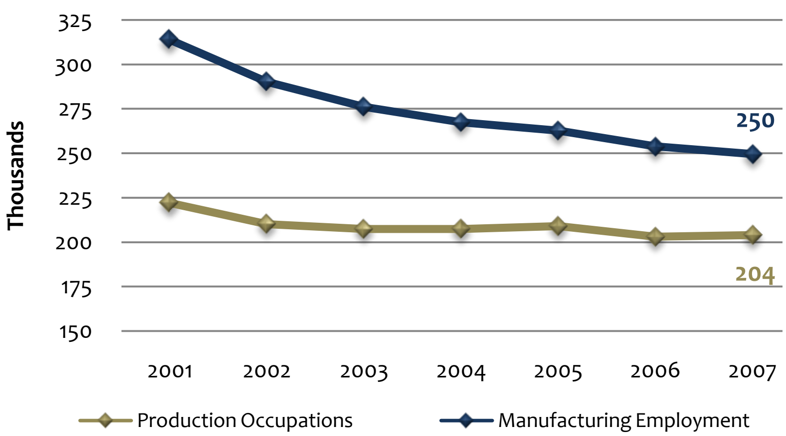


Source: U.S. Department of Labor, Bureau of Labor Statistics.

Employment

- Total manufacturing employment declined 20% in SC and 16% in the US from 2001 to 2007.
- Employment declines were driven by the non-durable goods sector which includes a number of labor-intensive subsectors such as textiles.
- Durable goods employment remained fairly constant, rising slightly from 2004 to 2007.
- A number of subsectors classified as Advanced Manufacturing witnessed employment increases, including chemical, electrical, automotive, and aerospace.

South Carolina Production Occupations

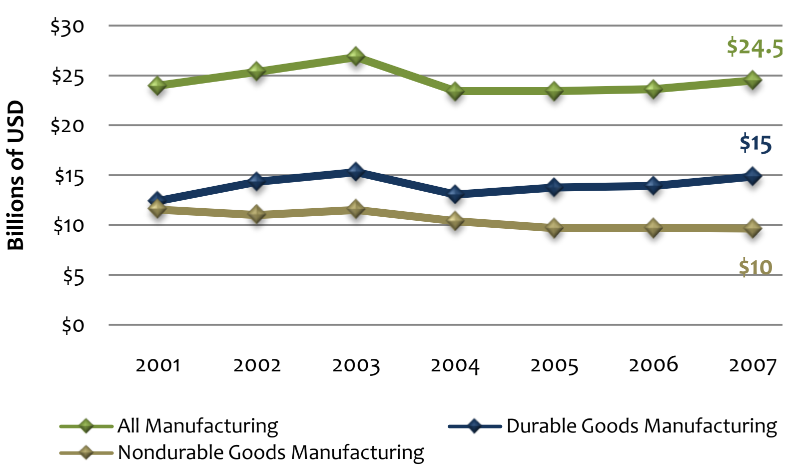


Source: U.S. Department of Labor, Bureau of Labor Statistics.

Occupational Changes

- Outsourcing of specialized plant functions—accounting, food service, maintenance services, etc.—is an increasing trend that shifts jobs from one industry classification to another, deflating jobs in the manufacturing industry.
- While employment in the manufacturing industry declined 20% between 2001 and 2007, production occupations declined only by 8%, partially due to the shifting classification of workers from the manufacturing industry to other industries.

South Carolina Manufacturing Output

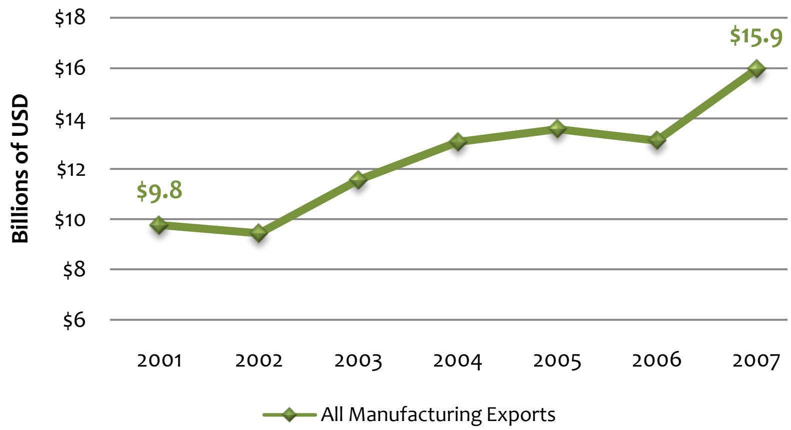


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Output/Production

- Total manufacturing output grew 2% in SC from 2001 to 2007, compared to 20% nationally.
- Durable goods output grew 20%, compared to national growth of 19%.
- Non-durable goods output declined 17% in SC.
- Substantial output growth ranging from 45% to 134% occurred in the electrical equipment, computers, wood products, and primary metals subsectors.

South Carolina Manufacturing Exports

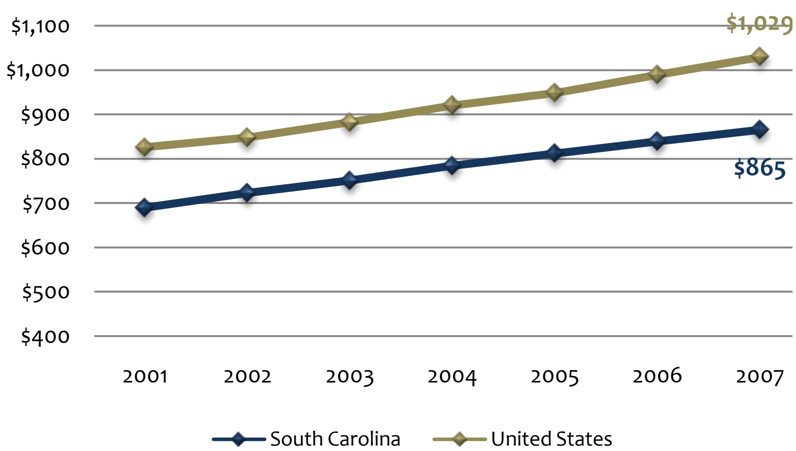


Source: U.S. Department of Commerce, Office of Trade and Industry Information.

Manufacturing Exports

- Manufacturing exports represent over 95% of SC's total exports.
- Manufacturing exports grew 98% between 2001 and 2007, from $9.8 billion to $15.9 billion.
- Sectors driving export growth include transportation equipment, machinery, chemicals, plastics and rubber, and paper.
- Declining export sectors include fabrics, textiles, beverages and tobacco, and printing.

South Carolina Manufacturing Weekly Wages



Source: U.S. Department of Labor, Bureau of Labor Statistics.

Weekly Wages

- Between 2001 and 2007, average weekly manufacturing wages increased 25.4% in SC versus 24.6% nationally.
- Advanced manufacturing subsectors, including industrial machinery, engine and turbine equipment, automotive, magnetic and optical media, and electromedical and control instruments, witnessed wage increases of between 26% and 42%.
- Manufacturers experiencing declining wages include confectionary products, cut and sew apparel, and leather products.

Introduction

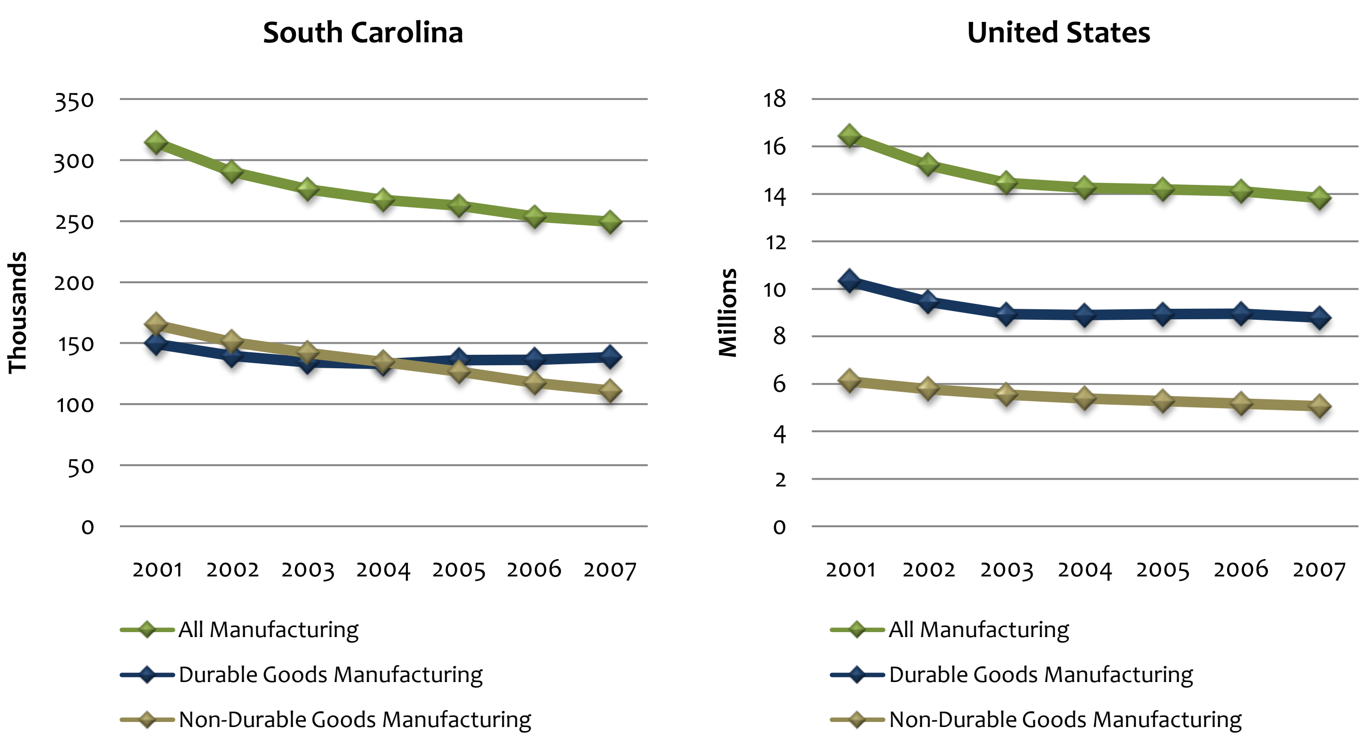
Manufacturing in the United States and in South Carolina can be described as in transition. Rapid advancement in engineering, technology, and processes has caused manufacturing to evolve from an industry requiring intensive labor inputs to one that is more capital-intensive. This transformation is largely summed up by the following statement:

> *"A decade ago, most factories tended to do 'batch' work, with large groups of employees churning out endless runs of the same pieces. That kind of work, which employs more people and includes a larger share of less-skilled positions, has been steadily migrating to lower-cost locales overseas. In the U.S., companies now have new equipment and streamlined operations that require fewer, more highly trained people to make more goods. Even as employment contracted, production in that same time period rose 10%."*[1]

Any discussion of manufacturing today typically focuses on declining employment in the industry. In reality, technological growth is driving changes in the economic structure of all industries, furthering their evolution from labor-intensive to increasingly capital-intensive endeavors. Manufacturing is no exception, reflecting industry-wide trends in which a premium is placed on fewer individuals with higher skill levels.

Employment loss has occurred in both South Carolina and the United States across broad manufacturing sectors (Figure 1). After a decrease between 2001 and 2003, the durable goods manufacturing sector in South Carolina actually experienced modest growth.

Figure 1: Manufacturing Employment, 2001 – 2007

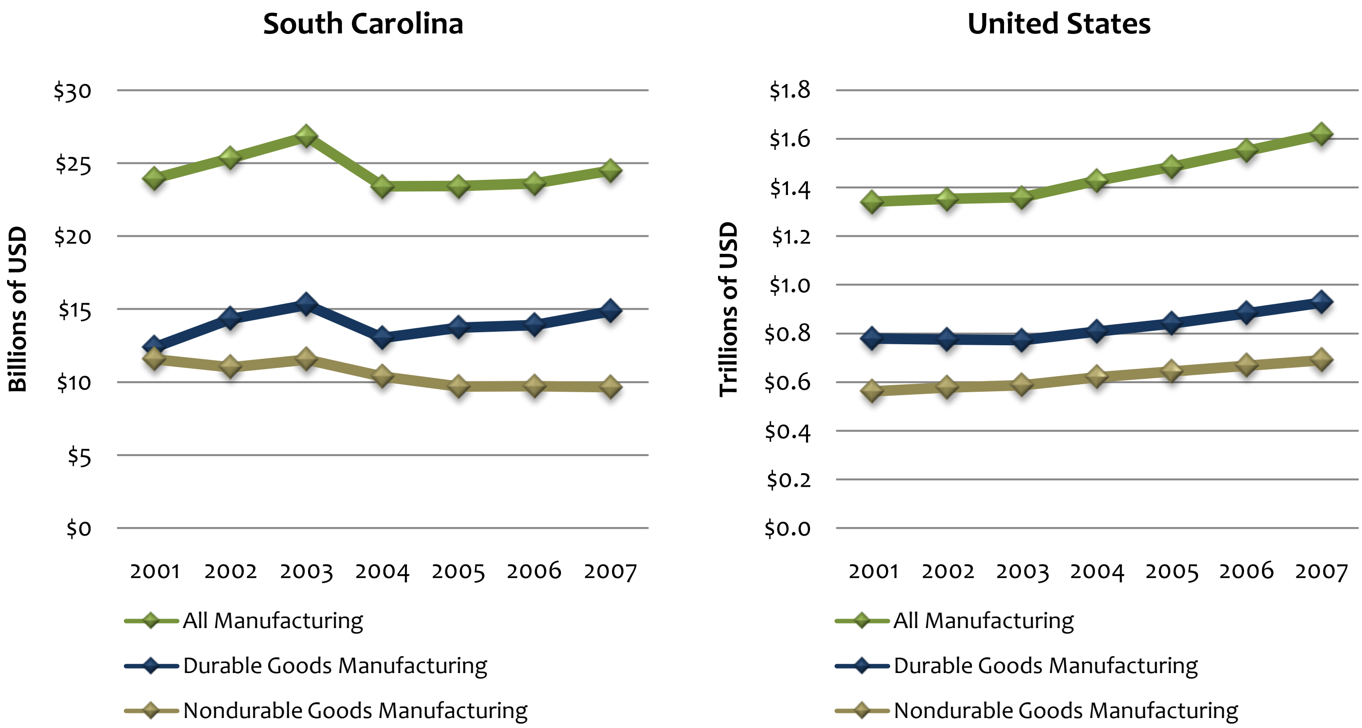


Source: U.S. Department of Labor, Bureau of Labor Statistics

[1] Source: Aeppel & Lahart, "Lean Factories Find it Hard to Cut Jobs Even in a Slump," *The Wall Street Journal*, March 9th, 2009.

Manufacturing output portrays a different picture in both South Carolina and the United States (Figure 2). Nationally, the United States witnessed output increases in both durable and non-durable goods, while South Carolina's textile-heavy, non-durable goods sector declined. South Carolina's durable goods manufacturing output increased 20%, compared to the national increase of 19%.

Figure 2: Manufacturing Output, 2001 – 2007



Source: U.S. Department of Commerce, Bureau of Economic Analysis

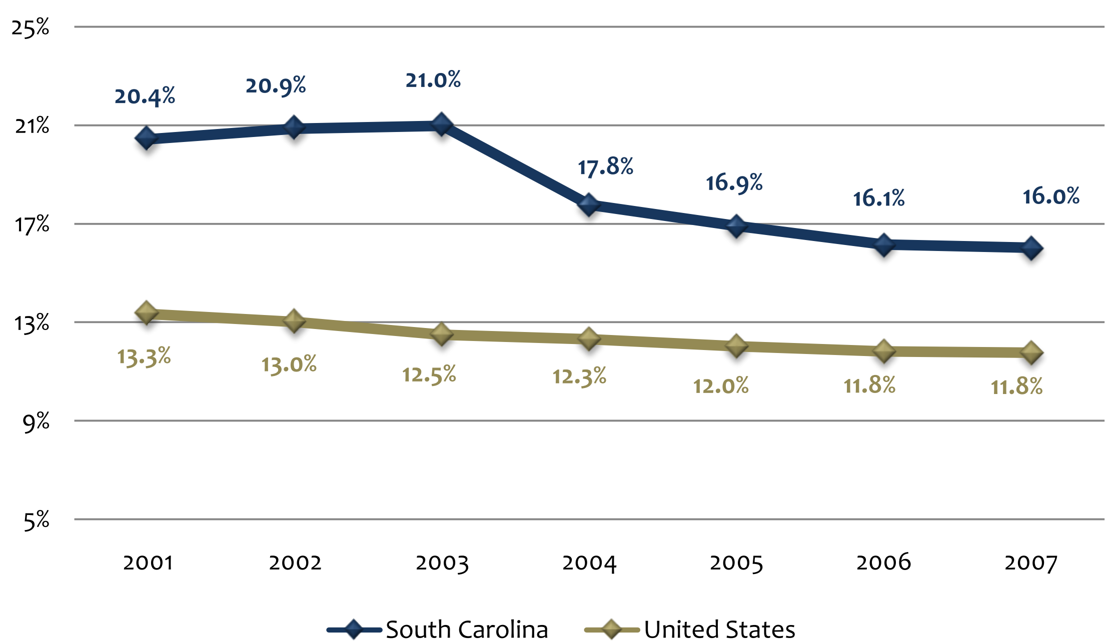
The remainder of this study presents an in-depth view of the manufacturing industry in South Carolina between 2001 and 2007. It explores not only employment and output at a detailed level within industry subsectors, but it also examines changes in exports, wages, manufacturing establishments, capital investment, and occupations.

OVERVIEW

Output for all manufacturers in South Carolina increased by 2% from 2001 to 2007, compared to a 20% gain at the national level. Durable goods manufacturing output increased more than United States increases for the same time period.

Manufacturing as a percentage of total output (Figure 3) declined in the state by 22% compared to 12% at the national level. After initial increases, manufacturing output drastically declined from 2003 to 2004 in South Carolina, attributed to a drop in demand of certain types of machinery during this time period. From 2005 to 2007, South Carolina has moved toward the national average for manufacturing as a percentage of total output.

Figure 3: Manufacturing Output (% of Total Output), 2001 – 2007

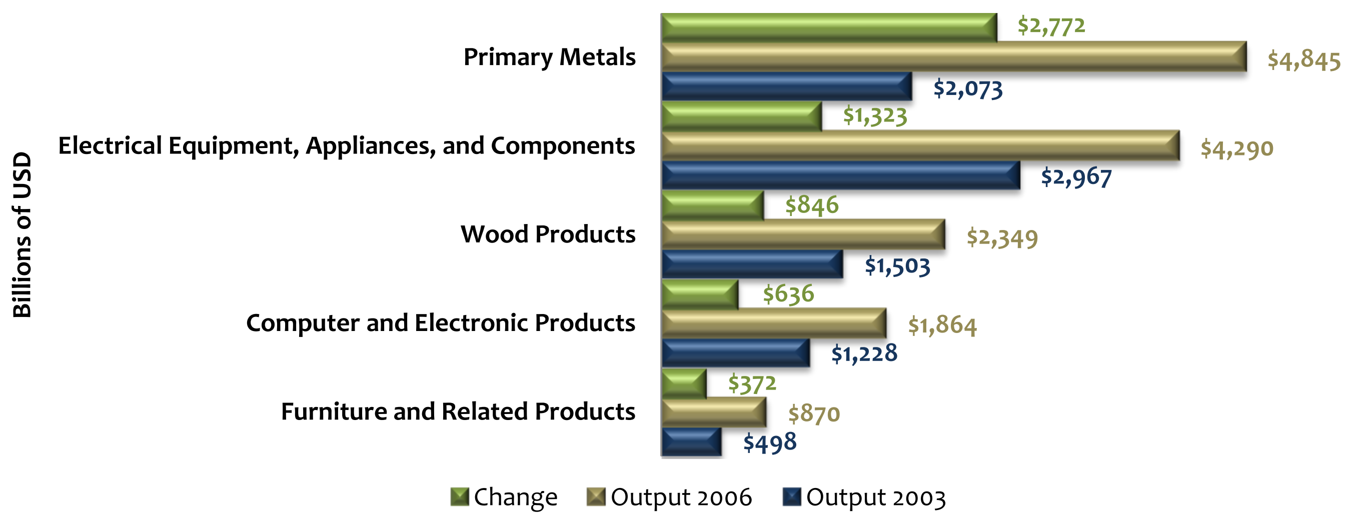


Source: U.S. Department of Commerce, Bureau of Economic Analysis

Gainers

Between 2003 and 2006, the five subsectors experiencing the greatest growth in output included primary metals; electrical equipment, appliances, and components; and computer and electronic products. All of these subsectors produce durable goods and two of these subsectors meet the definition of Advanced Manufacturing as defined by the U.S. Department of Commerce, Office of Technology Policy.

Figure 4: Output Growth: Leading Manufacturing Subsectors, 2003-2006

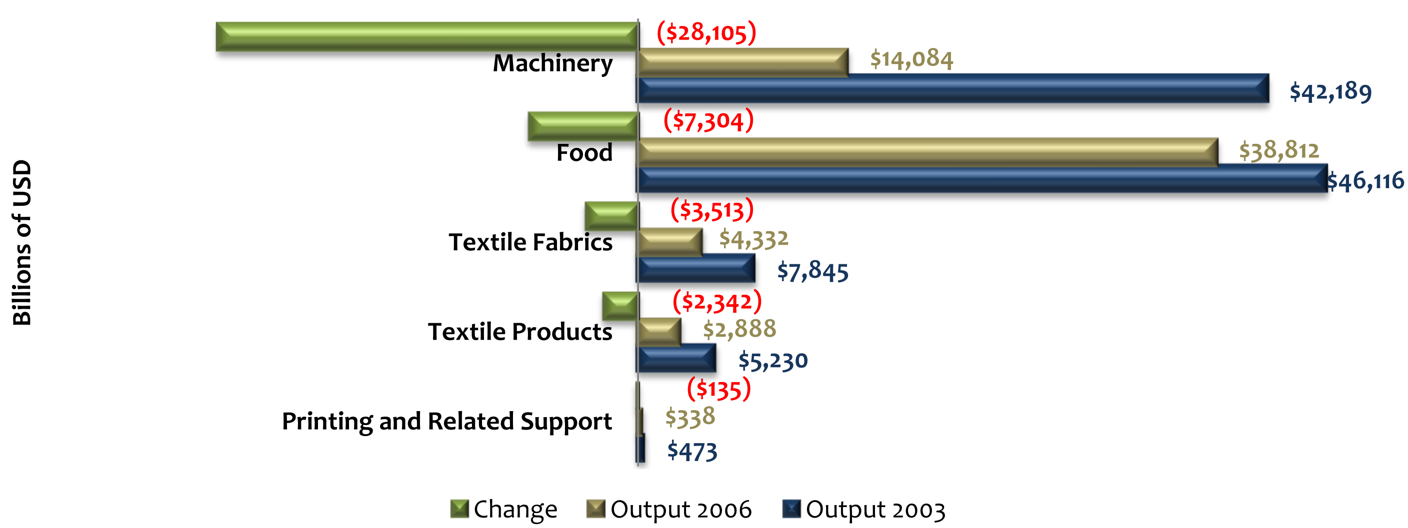


Source: U.S. Department of Commerce, Bureau of Economic Analysis

Decliners

The majority of the subsectors experiencing the greatest output declines are labor intensive industries such as textiles or food and beverage processing.

Figure 5: Output Decline: Lagging Manufacturing Subsectors, 2003-2006



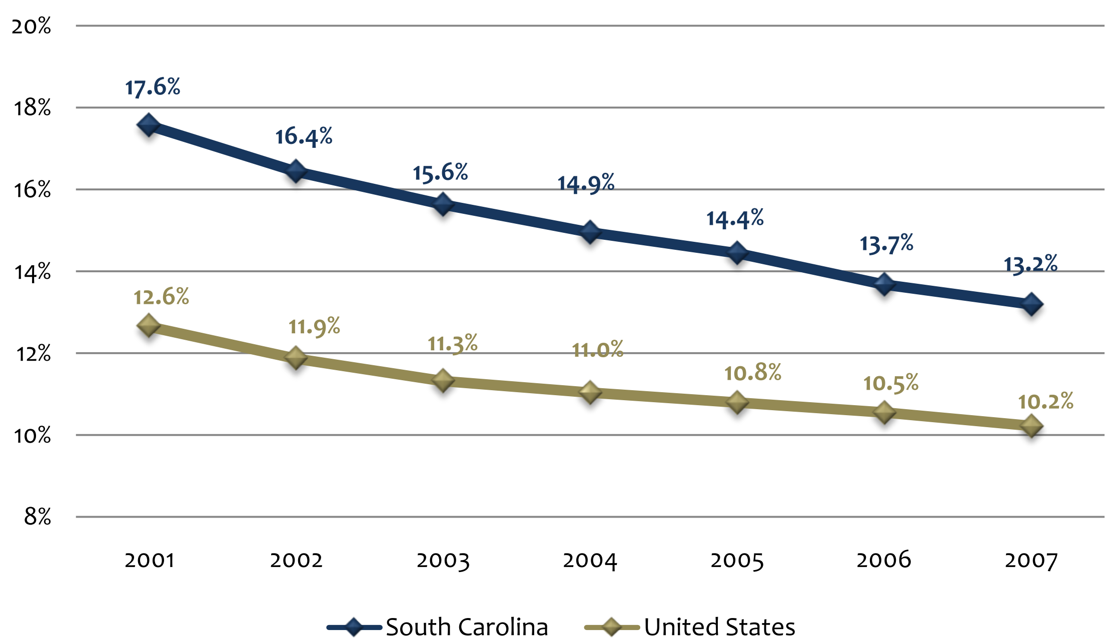
Source: U.S. Department of Commerce, Bureau of Economic Analysis

OVERVIEW

Manufacturing employment declined 20% from 2001 to 2007 in South Carolina, compared to a 16% decline in the United States. However, many subsectors witnessed positive employment gains.

As a percentage of total employment, manufacturing declined by 25%, from 17.6% to 13.2% (Figure 6). Nationally, the decline was 19%, from 12.6% to 10.2%.

Figure 6: Manufacturing Employment (% of Total Employment), 2001-2007

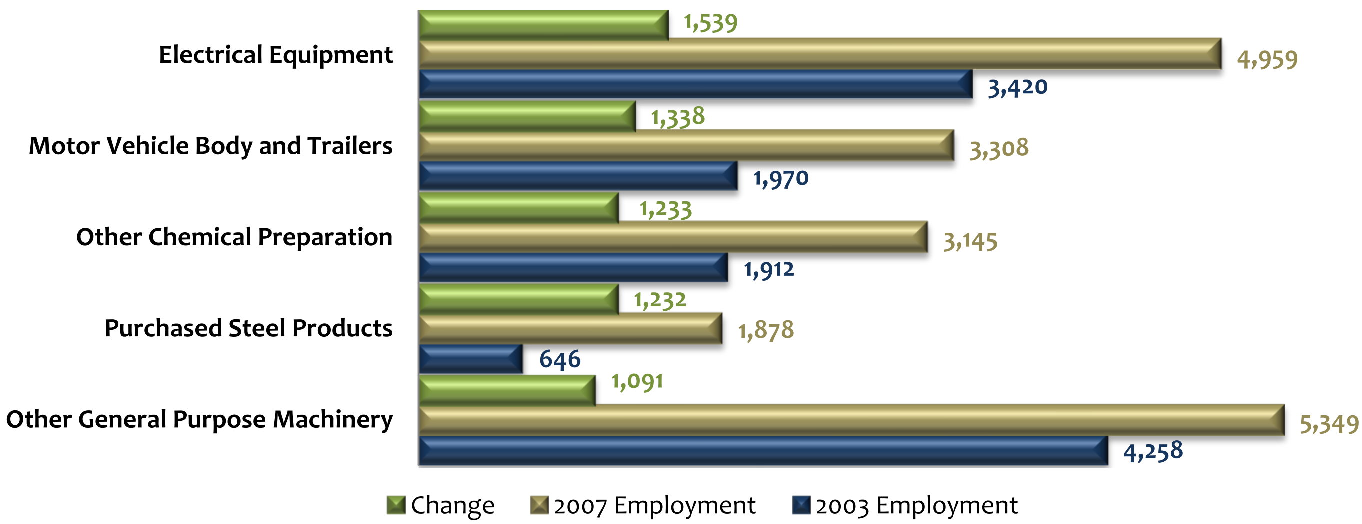


Source: U.S. Department of Labor, Bureau of Labor Statistics

GAINERS

From 2003 to 2007, thirty-four subsectors or 47% of all manufacturing subsectors had positive growth. Four out of the top five subsectors meet the definition of Advanced Manufacturing as defined by the U.S. Department of Commerce, Office of Technology Policy.

Figure 7: Employment Growth: Leading Manufacturing Subsectors, 2003-2007

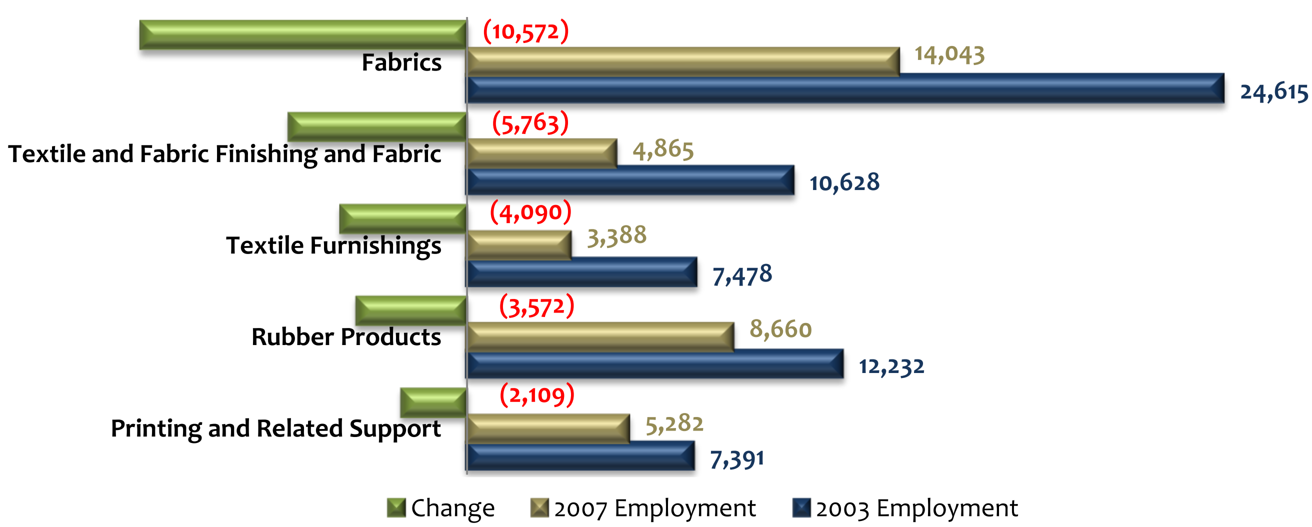


Source: U.S. Department of Labor, Bureau of Labor Statistics

DECLINERS

From 2003 to 2007, 102 manufacturing subsectors lost employment in South Carolina. Three of the five bottom subsectors that lost employment are part the textile industry, losing over 20,000 during the five year period.

Figure 8: Employment Decline: Lagging Manufacturing Subsectors, 2003-2007



Source: U.S. Department of Labor, Bureau of Labor Statistics

Exports

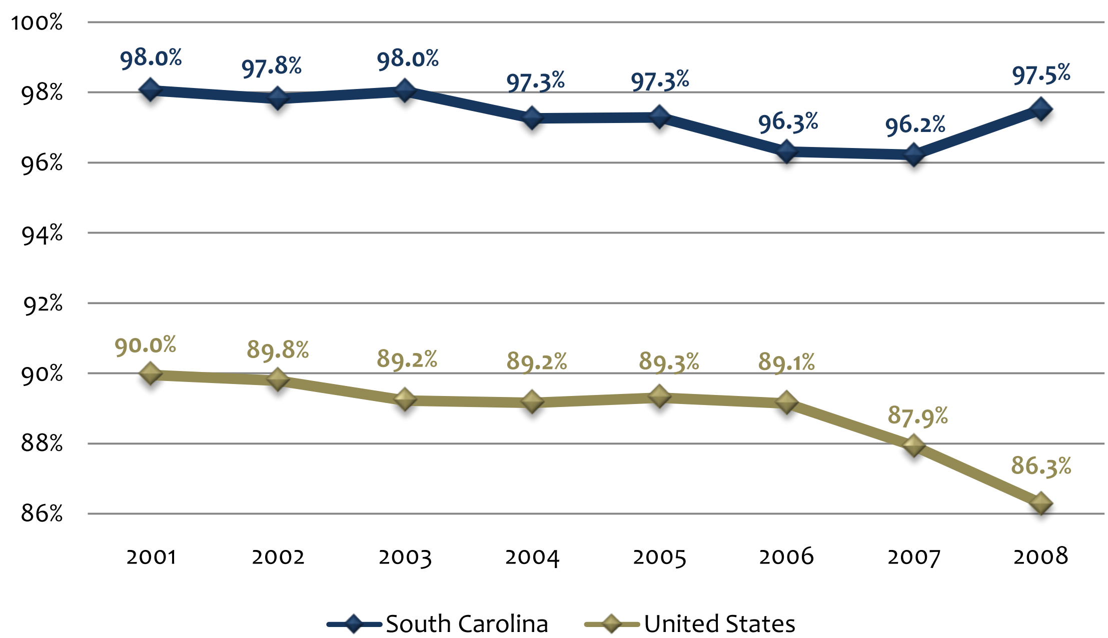
Overview

From 2004 to 2008, South Carolina manufacturers accounted for more than 95% of total state exports (Figure 9). Total exports in 2008 exceeded $19 billion.

As a percentage of total exports, manufacturing declined by 0.6%, from 98.0% to 97.5%. Nationally, the decline was 4.1%, from 90.0% to 86.3%.

South Carolina manufacturing exports as a percentage of total exports have consistently remained higher than national totals due to a higher concentration of manufacturing in the state.

Figure 9: Manufacturing Exports (% of Total Exports), 2001-2008

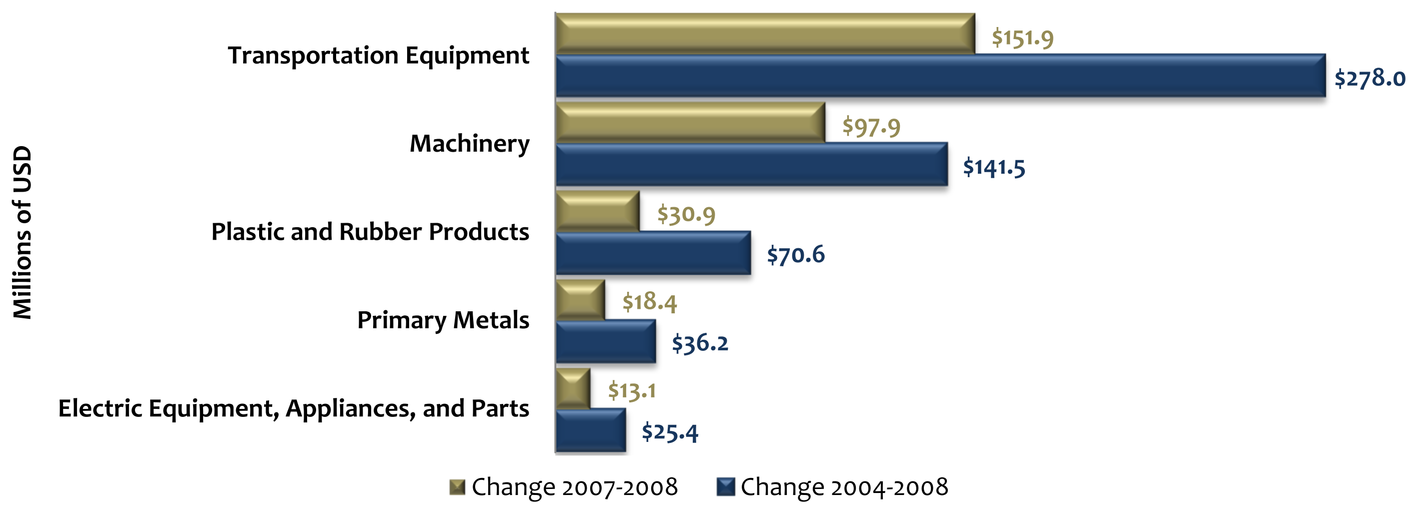


Source: U.S. Department of Commerce, Office of Trade and Industry Information.

Gainers

Between 2007 and 2008, the transportation subsector had the biggest dollar increase in exports. They also saw the biggest dollar increase from 2004 to 2008. Four of the leading subsectors meet the definition of Advanced Manufacturing as defined by the U.S. Department of Commerce, Office of Technology Policy.

Figure 10: Export Growth: Leading Manufacturing Subsectors, 2004-2008

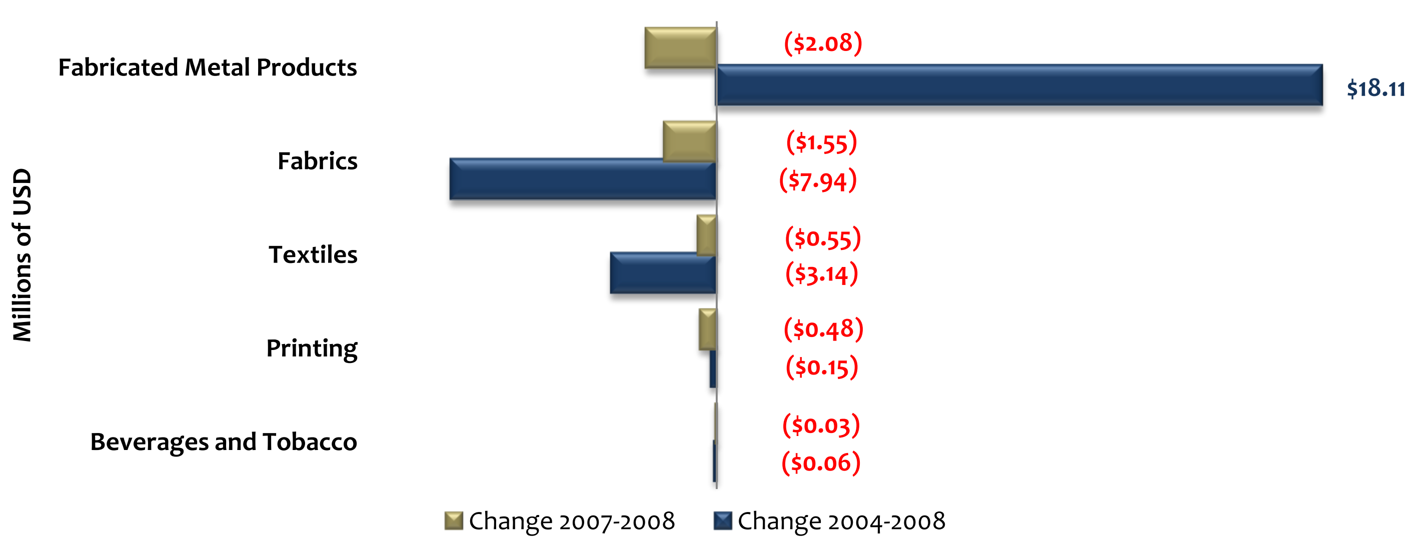


Source: U.S. Department of Commerce, Office of Trade and Industry Information.

Decliners

Between 2007 and 2008, the fabricated metal products subsector had the biggest dollar decrease in exports, but saw the dollar increases from 2004 to 2008. Two of the declining subsectors were part of the textile industry.

Figure 11: Export Decline: Lagging Manufacturing Subsectors, 2004-2008



Source: U.S. Department of Commerce, Office of Trade and Industry Information.

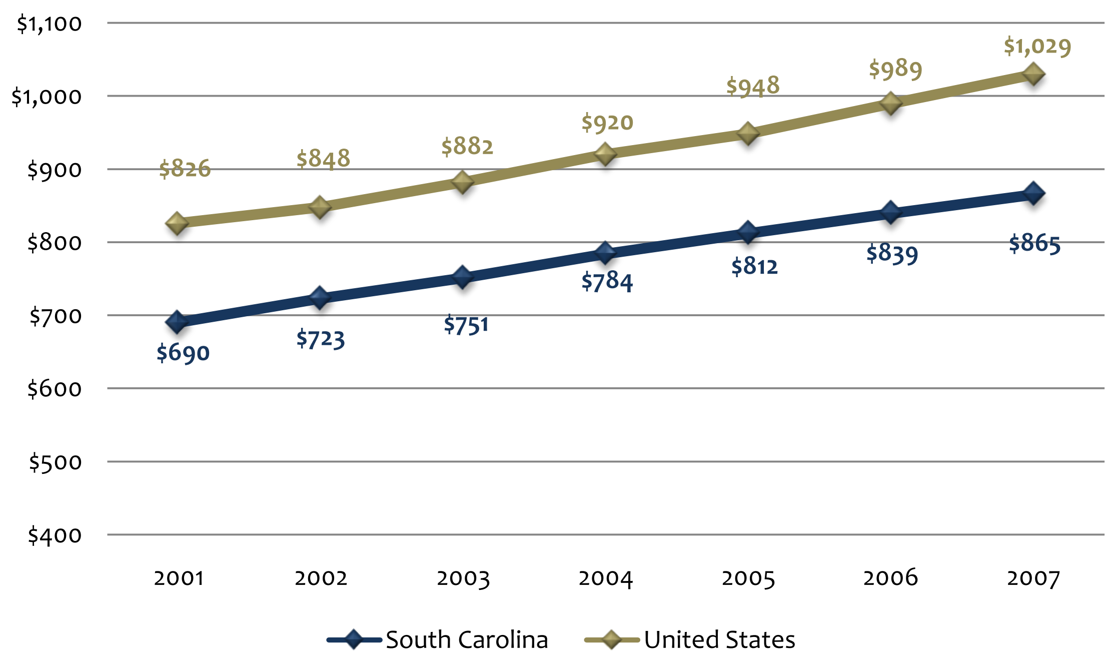
Wages

Overview

In 2007, South Carolina's manufacturing average weekly wage was $865, 16% below the national average weekly wage of $1,029 (Figure 12).

Wages grew across all manufacturing in South Carolina by 25.4% from 2001 to 2007, slightly better than the United States growth for the same time period at 24.6%.

Figure 12: Manufacturing Average Weekly Wages, 2001-2007

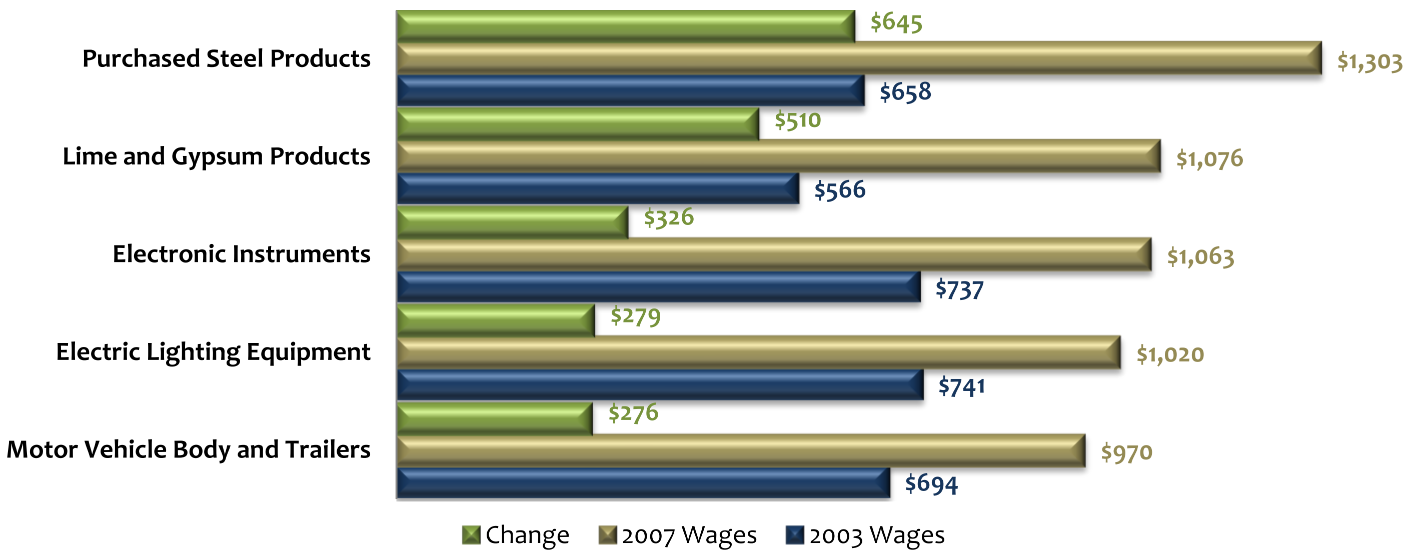


Source: U.S. Department of Labor, Bureau of Labor Statistics

GAINERS

From 2003 to 2007, the leading manufacturing subsectors had the wage increases ranging from 39% to 98%. Two of the leading subsectors meet the definition of Advanced Manufacturing as defined by the U.S. Department of Commerce, Office of Technology Policy.

Figure 13: Average Weekly Wage Growth: Leading Manufacturing Subsectors, 2003-2007

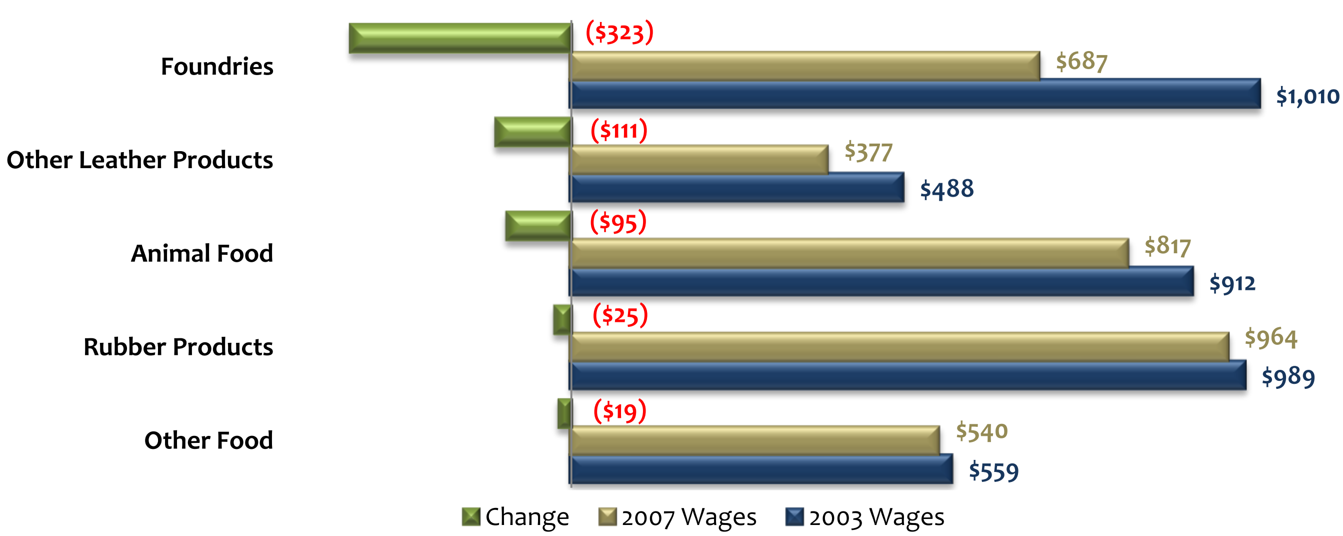


Source: U.S. Department of Labor, Bureau of Labor Statistics

DECLINERS

From 2003 to 2007, the bottom manufacturing subsectors had the wage decreases ranging from 3% to 32%. Three subsectors that lost wages are labor-intensive manufacturers.

Figure 14: Average Weekly Wage Decline: Lagging Manufacturing Subsectors, 2003-2007



Source: U.S. Department of Labor, Bureau of Labor Statistics

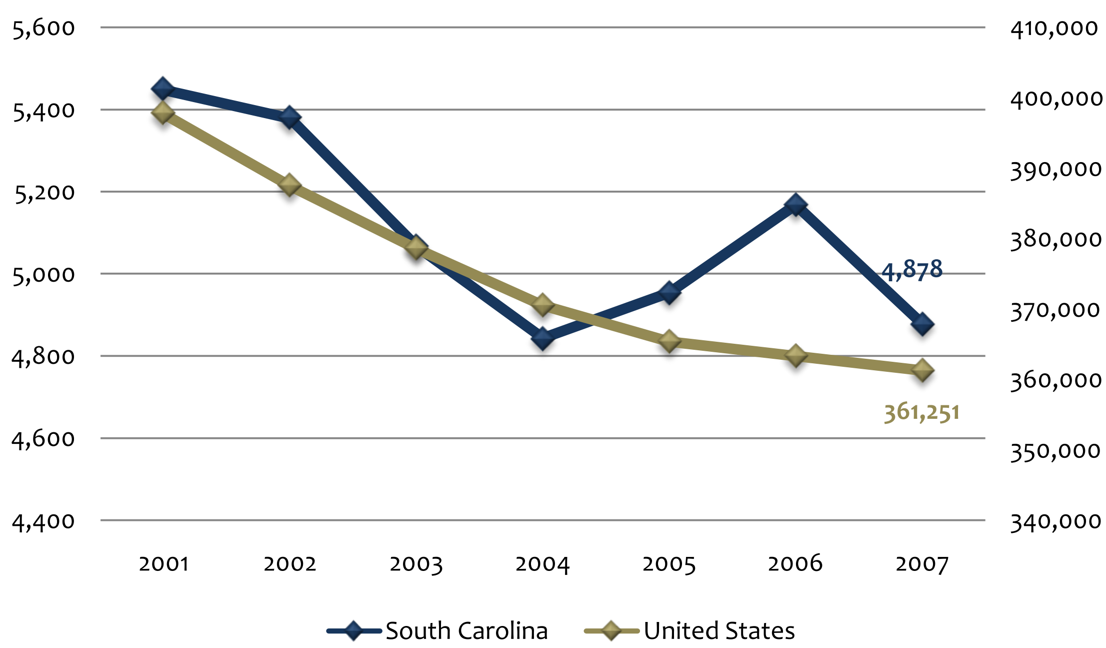
ESTABLISHMENTS

OVERVIEW

In 2007, South Carolina had 4,878 manufacturing establishments. Figure 15 shows South Carolina and United States establishment growth from 2001 to 2007.

The number of manufacturing establishments declined by 10.4% in South Carolina from 2001 to 2007, slightly higher than United States establishment declines at 9.2%. While national establishment decline has been gradual, South Carolina has had increases and decreases over the time period.

Figure 15: Manufacturing Establishments, 2001-2007

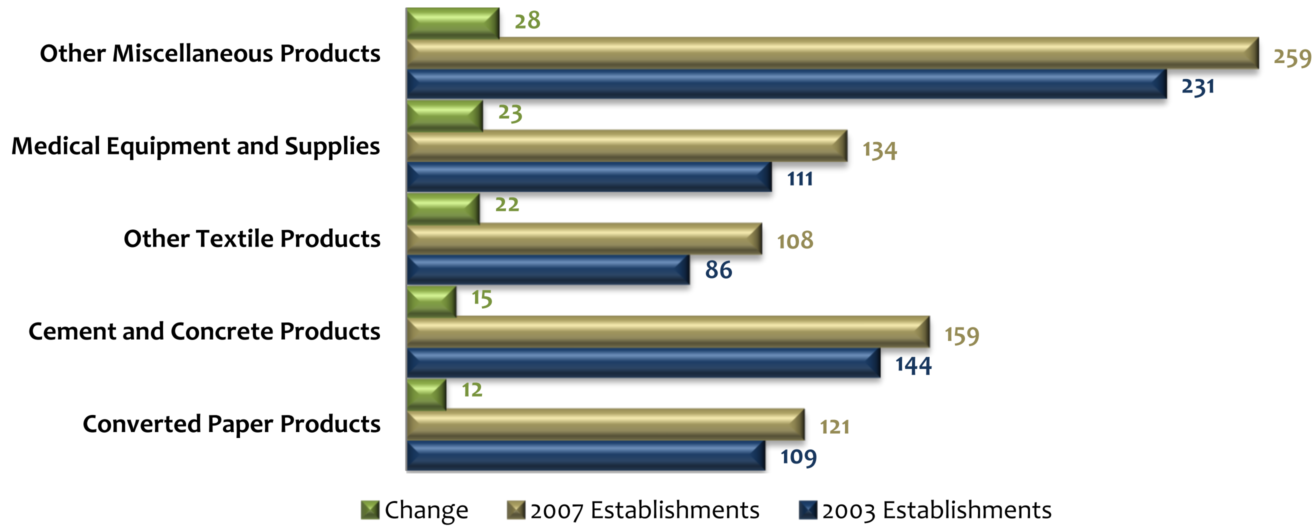


Source: U.S. Department of Labor, Bureau of Labor Statistics

Gainers

From 2003 to 2007, thirty-three subsectors or 45% of all manufacturing subsectors experienced positive growth. Increases in establishments from the medical equipment and supplies subsector and the cement and concrete products subsector directly support emerging industries such as biotechnology and nuclear operations.

Figure 16: Establishment Growth: Leading Manufacturing Subsectors, 2003-2007

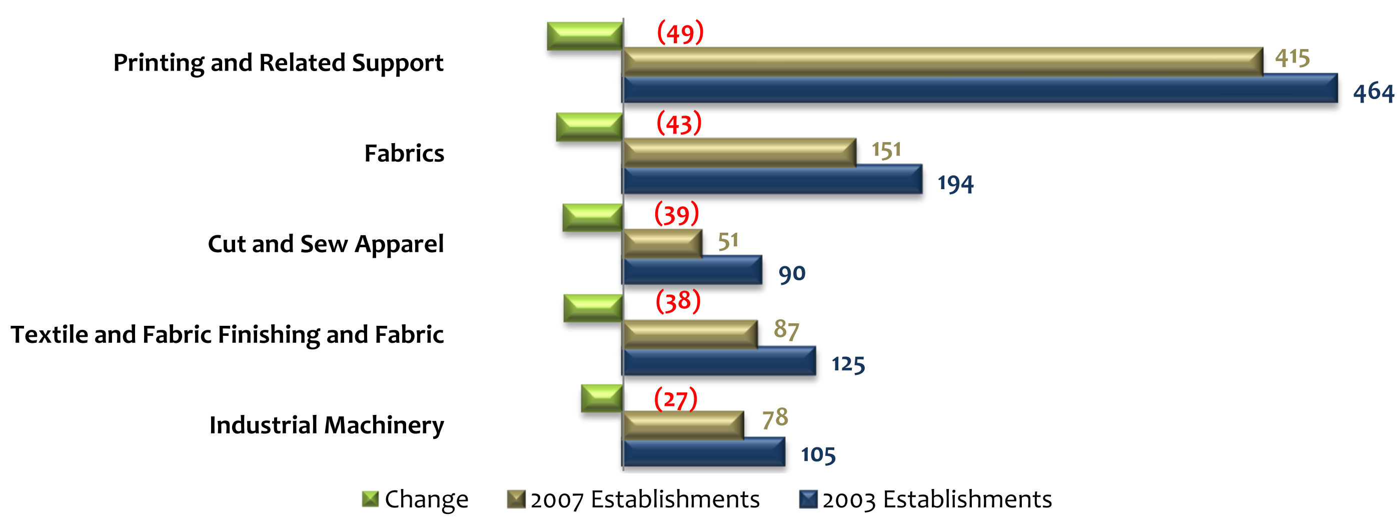


Source: U.S. Department of Labor, Bureau of Labor Statistics

Decliners

From 2003 to 2007, establishment declines for the bottom five manufacturing subsectors ranged from 10% to nearly 26%. Three of the five subsectors that lost establishments are part the textile industry.

Figure 17: Establishment Decline: Lagging Manufacturing Subsectors, 2003-2007

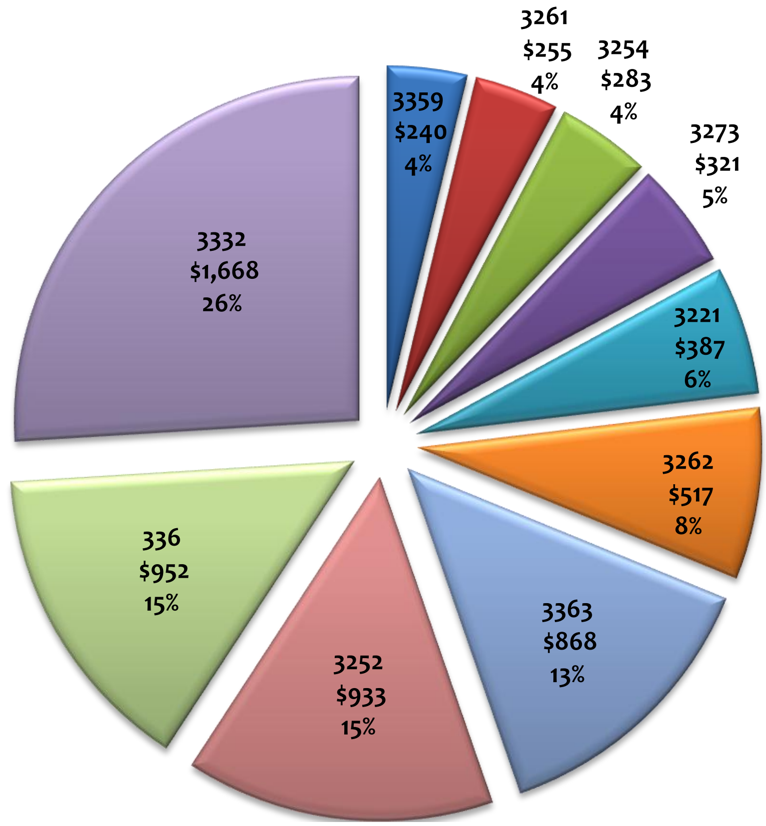


Source: U.S. Department of Labor, Bureau of Labor Statistics

Capital Investment

Over the past three years, manufacturers have invested over $11.8 billion in South Carolina's economy. The pie chart below highlights the top ten manufacturers who have invested in the state.

Figure 18: Capital Investment: Leading Manufacturing Subsectors, 2006-2008 (millions of USD)



Source: S.C. Department of Commerce, Division of Research

NAICS Code Key

NAICS Code	Description
3359	Other Electrical Equipment
3261	Plastic Products
3254	Pharmaceutical and Medicine
3273	Cement and Concrete Products
3221	Pulp, Paper, and Paperboard
3262	Rubber Products
3363	Motor Vehicle Parts
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers
336	Transportation Equipment
3332	Industrial Machinery

MANUFACTURING INDEX

Due to the array of measures available to analyze manufacturing subsectors, a manufacturing index was calculated to identify subsectors that had positive growth across multiple measures.

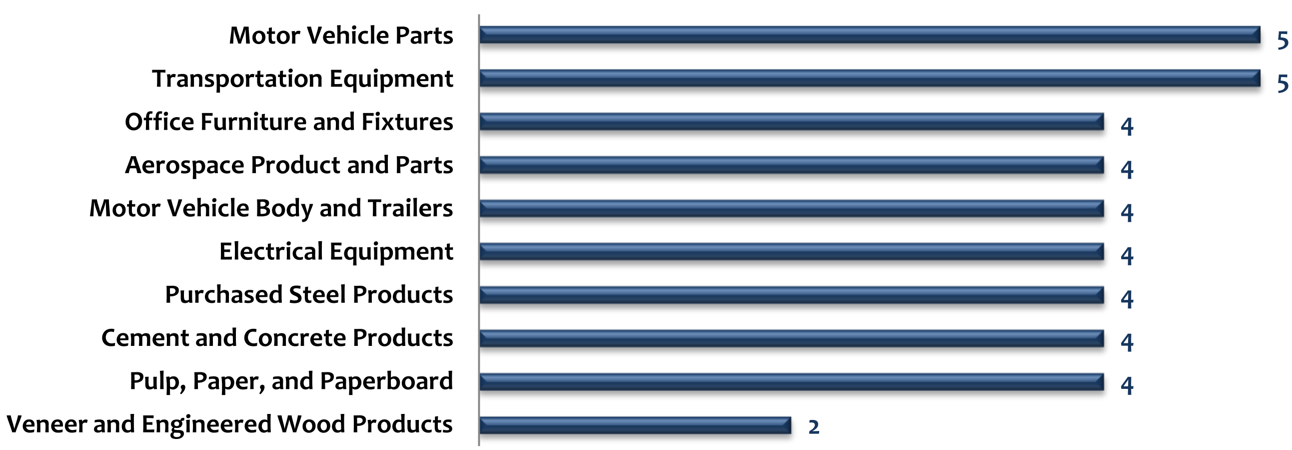
The index was calculated using the following factors:

- 2003-2007 Establishment data: Positive growth = 1, No growth = 0, Negative growth = -1
- 2003-2007 Employment data: Positive growth greater than 9.9% = 1, Growth equal to 9.9% = 0, Growth less than 9.9% = -1
- 2003-2007 Wage data: Positive growth greater than 9.9% = 1, Growth equal to 9.9% = 0, Growth less than 9.9% = -1
- 2003-2006 Output data: Positive growth greater than 5% = 1, Growth equal to 5% = 0, Growth less than 5% = -1
- 2006-2008 Capital Investment data: Equal to or greater than $500 million = 2, greater than $125.8 million = 1, equal to $125.8 million = 0, less than $125.8 million = -1
- 2004-2008 Export data: Positive growth greater than 57% = 1, Growth equal to 57% = 0, Growth less than 57% = -1

Data revealed the following observations:

- The index distinguished 18 manufacturing subsectors with a positive index number ranging from one to five.
- Four of the ten highest ranking manufacturing subsectors are part of the transportation sector.
- Five of the ten highest ranking subsectors meet the definition of Advanced Manufacturing as defined by the U.S. Department of Commerce, Office of Technology Policy.

Figure 19: Manufacturing Index: Leading Manufacturing Subsectors



Source: S.C. Department of Commerce, Division of Research

Leading Occupations in Growth Sectors

The U.S. Department of Labor, Bureau of Labor Statistics (BLS) maintains detailed data for over 800 occupations in the nation under a Standard Occupational Code (SOC) classification system. For each occupation, the BLS classifies each state in employment concentration for individual occupations compared to employment for all occupations in each corresponding state.

South Carolina is classified by the BLS as one of the top five states in employment concentration in occupations listed in the table below.[2] All of these occupations listed below have been identified by the BLS as top occupations in growing manufacturing subsectors in South Carolina.

For each occupation, the occupation's description, employment, percent of state employment for the specific occupation, South Carolina's rank in the nation in employment concentration per worker, and number of manufacturing subsectors that utilize this occupation are highlighted.

Table 1: South Carolina Manufacturing-Related Occupational Concentrations, 2007

SOC Code	Description	Employment	% of SC Employment	US Rank	Manufacturing Subsectors Requiring Occupation
17-2112	Industrial Engineers	5,580	0.29%	2nd	13
17-3026	Industrial Engineering Technicians	1,950	0.10%	4th	3
49-9041	Industrial Machinery Mechanics	24,340	0.34%	5th	16
49-9042	Maintenance & Repair Workers, General	130,100	1.43%	1st	40
51-2031	Engine & Other Machine Assemblers	2,340	0.13%	3rd	6
51-2091	Fiberglass Laminators & Fabricators	12,500	0.06%	5th	5
51-2092	Team Assemblers	37,760	2.01%	2nd	82
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	8,690	0.14%	5th	8
51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	5,630	0.04%	4th	5
51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	5,520	0.07%	1st	5
51-8091	Chemical Plant & System Operators	19,690	0.10%	4th	8
51-9011	Chemical Equipment Operators & Tenders	13,920	0.17%	1st	8
51-9023	Mixing & Blending Machine Setters, Operators & Tenders	13,340	0.17%	1st	17
51-9041	Extruding, Forming, Pressing & Compacting Machine Setters, Operators & Tenders	15,550	0.14%	4th	7
51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	3,200	0.04%	5th	3
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	33,780	0.61%	3rd	51
51-9197	Tire Builders	1,060	0.12%	1st	2

[2] Source: U.S. Department of Labor, Bureau of Labor Statistics, May 2007 Occupation Employment Statistics.

Conclusion

Although the manufacturing industry has witnessed an overall decline in employment since 2001, this single statistic does not define the entire dynamics within the industry. During the same period, South Carolina manufacturers accounted for more than 95% of total state exports. Manufacturers also invested over $11.8 billion in the state economy.

Furthermore, a closer analysis of the manufacturing industry shows a number of subsectors in South Carolina are expanding, with some experiencing positive growth in all measures. These subsectors represent a growing capital-intensive and technology-centric manufacturing industry requiring a smaller yet high-skilled labor force. Many of these growing subsectors are classified as Advanced Manufacturing. Examples of these subsectors include aerospace products and parts, electrical equipment, motor vehicle bodies, and motor vehicle parts.

South Carolina's future manufacturing industry will continue to evolve with further technological progress as the industry focuses on the following:

- Capitalizing on the positive growth found in manufacturing subsectors that support transportation and alternative energy sectors. Positive growth exists in industries that support nuclear production (concrete and steel products) and wind production (engine turbines) among others.
- Encouraging growth in knowledge-driven occupations and training programs that can supply labor to capital-intensive and technology-centric manufacturing processes, increasing South Carolina's output and economic growth.

Appendix A: All Manufacturers

NAICS	Industry	2003-2007 % Change Establishments	2003-2007 % Change Employment	2003-2007 % Change Wages	2003-2006 % Change Output	2006-2008 Capital Investment	2004-2008 Export Growth	Index
325	Chemical Manufacturing	2.0%	-1.2%	8.1%	-4.0%	$1,585,650,000	17.0%	-1
336	Transportation Equipment Manufacturing	4.9%	4.8%	12.5%	7.0%	$952,359,210	63.4%	5
3111	Animal Food Manufacturing	-27.3%	-2.3%	-10.4%	-16.0%	$17,550,000	44.7%	-6
3112	Grain & Oilseed Milling	-18.2%	120.8%	-0.5%	-16.0%	$8,000,000	44.7%	-4
3115	Dairy Product Manufacturing	-50.0%	-17.5%	14.1%	-16.0%	$0	44.7%	-4
3116	Animal Slaughtering & Processing	-12.3%	2.2%	17.2%	-16.0%	$45,605,000	44.7%	-4
3118	Bakeries & Tortilla Manufacturing	-17.4%	-6.5%	8.7%	-16.0%	$25,000,000	44.7%	-6
3119	Other Food Manufacturing	52.9%	-21.9%	-3.4%	-16.0%	$3,800,000	44.7%	-4
3131	Fiber, Yarn, & Thread Mills	-13.6%	-15.2%	25.2%	-45.0%	$0	-13.9%	-4
3132	Fabric Mills	-22.2%	-42.9%	13.0%	-45.0%	$16,000,000	-13.9%	-4
3133	Textile & Fabric Finishing & Fabric	-30.4%	-54.2%	12.5%	-45.0%	$3,000,000	-13.9%	-4
3141	Textile Furnishings Mills	-25.0%	-54.7%	16.3%	-45.0%	$0	-37.8%	-4
3149	Other Textile Product Mills	25.6%	-6.4%	10.3%	-45.0%	$5,275,000	-37.8%	-2
3152	Cut & Sew Apparel Manufacturing	-43.3%	-42.4%	2.5%	-13.0%	$0	14.0%	-6
3169	Other Leather Product Manufacturing	-33.3%	-45.1%	-22.7%	N/A	$0	120.7%	-2
3211	Sawmills & Wood Preservation	-4.8%	11.6%	11.6%	56.0%	$16,500,000	10.1%	0
3212	Veneer & Engineered Wood Products	2.4%	19.1%	23.9%	56.0%	$81,410,000	10.1%	2
3219	Other Wood Product Manufacturing	4.8%	29.3%	26.5%	56.0%	$41,400,000	10.1%	2
3221	Pulp, Paper, & Paperboard Mills	16.7%	-3.5%	16.7%	19.0%	$387,300,000	85.1%	4
3222	Converted Paper Product Manufacturing	11.0%	-9.3%	19.9%	19.0%	$87,000,000	85.1%	2
3231	Printing & Related Support Activities	-10.6%	-28.5%	1.3%	-29.0%	$1,500,000	-11.0%	-6
3241	Petroleum & Coal Products Manufacturing	10.5%	1.0%	14.4%	58.0%	$0	218.8%	2
3251	Basic Chemical Manufacturing	9.6%	-4.6%	9.4%	-4.0%	$253,000,000	17.0%	-2
3252	Resin, Rubber, & Synthetic Fibers	1.7%	-18.3%	4.8%	-4.0%	$933,275,000	17.0%	-1
3253	Agricultural Chemical Manufacturing	-13.3%	-19.5%	27.2%	-4.0%	$5,095,000	17.0%	-4
3254	Pharmaceutical & Medicine Manufacturing	34.8%	28.2%	17.4%	-4.0%	$283,280,000	17.0%	2
3255	Paint, Coating, & Adhesive Manufacturing	-16.0%	-7.7%	19.3%	-4.0%	$26,700,000	17.0%	-4
3256	Cleaning Compound & Toiletry Mfg	-12.7%	-4.0%	6.5%	-4.0%	$2,000,000	17.0%	-6
3259	Other Chemical Preparation Manufacturing	2.1%	64.5%	6.4%	-4.0%	$82,300,000	17.0%	-2
3261	Plastics Product Manufacturing	-3.2%	6.1%	11.6%	-15.0%	$254,745,000	73.6%	0
3262	Rubber Product Manufacturing	6.3%	-29.2%	-2.5%	-15.0%	$517,126,000	73.6%	1
3271	Clay Product & Refractory Manufacturing	-3.1%	-3.0%	11.2%	30.0%	$9,900,000	40.3%	-2
3272	Glass & Glass Product Manufacturing	12.5%	0.9%	8.4%	30.0%	$54,000,000	40.3%	-2
3273	Cement & Concrete Product Manufacturing	10.4%	16.4%	18.3%	30.0%	$320,530,000	40.3%	4
3274	Lime & Gypsum Product Manufacturing	0.0%	100.0%	90.1%	30.0%	$0	40.3%	1
3279	Other Nonmetallic Mineral Products	8.0%	6.5%	7.9%	30.0%	$39,000,000	40.3%	-2

NAICS	Industry	2003-2007 % Change Establishments	2003-2007 % Change Employment	2003-2007 % Change Wages	2003-2006 % Change Output	2006-2008 Capital Investment	2004-2008 Export Growth	Index
3311	Iron & Steel Mills & Ferroalloys	13.6%	-6.1%	15.9%	134.0%	$0	256.2%	2
3312	Purchased Steel Product Manufacturing	44.4%	190.7%	98.0%	134.0%	$0	256.2%	4
3313	Alumina & Aluminum Production	-14.3%	11.6%	7.3%	134.0%	$0	256.2%	0
3314	Other Nonferrous Metal Production	20.0%	8.3%	30.1%	134.0%	$0	256.2%	2
3315	Foundries	-9.7%	-42.3%	-32.0%	134.0%	$0	256.2%	-2
3321	Forging & Stamping	-3.0%	-2.2%	7.8%	1.0%	$50,500,000	53.3%	-6
3322	Cutlery & Handtool Manufacturing	13.3%	-30.0%	34.3%	1.0%	$7,300,000	53.3%	-2
3323	Architectural & Structural Metals	-1.0%	-19.8%	3.9%	1.0%	$65,710,000	53.3%	-6
3324	Boilers, Tanks, & Shipping Containers	-13.3%	29.6%	14.6%	1.0%	$27,000,000	53.3%	-2
3325	Hardware Manufacturing	75.0%	-15.8%	21.9%	1.0%	$0	53.3%	-2
3326	Spring & Wire Product Manufacturing	0.0%	10.5%	23.1%	1.0%	$0	53.3%	-1
3327	Machine Shops & Threaded Products	-7.1%	10.1%	12.9%	1.0%	$3,000,000	53.3%	-2
3328	Coating, Engraving & Heat Treating Metal	5.1%	3.5%	23.2%	1.0%	$2,300,000	53.3%	-2
3329	Other Fabricated Metal Product Mfg	5.9%	1.1%	14.1%	1.0%	$197,711,000	53.3%	0
3331	Ag., Construction, & Mining Machinery	-6.7%	29.1%	7.4%	-67.0%	$82,220,000	94.6%	-2
3332	Industrial Machinery Manufacturing	-25.7%	-36.1%	30.2%	-67.0%	$1,668,490,000	94.6%	1
3333	Commercial & Service Industry Machinery	-19.4%	-27.8%	1.8%	-67.0%	$0	94.6%	-4
3334	HVAC & Commercial Refrigeration Equip	-3.2%	-13.4%	13.3%	-67.0%	$12,500,000	94.6%	-2
3335	Metalworking Machinery Manufacturing	-10.2%	-7.2%	15.3%	-67.0%	$57,300,000	94.6%	-2
3336	Turbine & Power Transmission Equipment	-15.0%	22.5%	25.7%	-67.0%	$0	94.6%	0
3339	Other General Purpose Machinery Mfg	-7.9%	25.6%	16.4%	-67.0%	$75,350,000	94.6%	0
3341	Computers & Peripheral Equipment	9.1%	-2.4%	13.8%	52.0%	$0	-33.1%	0
3342	Communications Equipment Manufacturing	-28.6%	-5.8%	16.6%	52.0%	$0	-33.1%	-2
3344	Semiconductor & Electronic Components	-5.4%	-31.5%	11.6%	52.0%	$0	-33.1%	-2
3345	Electronic Instrument Manufacturing	34.4%	26.7%	44.2%	52.0%	$62,400,000	-33.1%	2
3351	Electric Lighting Equipment Mfg	-26.7%	52.0%	37.7%	45.0%	$0	63.3%	2
3352	Household Appliance Manufacturing	-15.4%	-23.0%	14.9%	45.0%	$0	63.3%	0
3353	Electrical Equipment Manufacturing	14.0%	45.0%	21.3%	45.0%	$0	63.3%	4
3359	Other Electrical Equipment & Components	-2.6%	5.8%	9.2%	45.0%	$240,700,000	63.3%	0
3362	Motor Vehicle Body & Trailer Mfg	5.7%	67.9%	39.8%	7.0%	$475,000	63.4%	4
3363	Motor Vehicle Parts Manufacturing	3.5%	-4.9%	13.1%	7.0%	$867,924,000	63.4%	5
3364	Aerospace Product & Parts Manufacturing	25.0%	91.6%	10.5%	56.0%	$19,800,000	63.4%	-1
3365	Railroad Rolling Stock Manufacturing	0.0%	7.8%	7.3%	56.0%	$0	63.4%	-1
3366	Ship & Boat Building	-13.0%	40.0%	5.5%	56.0%	$23,500,000	63.4%	0
3371	Household & Institutional Furniture	-8.4%	-21.5%	9.9%	75.0%	$0	114.4%	-2
3372	Office Furniture & Fixtures Mfg	32.4%	16.5%	16.4%	75.0%	$0	114.4%	4
3379	Other Furniture Related Product Mfg	-11.8%	13.5%	8.0%	75.0%	$0	114.4%	0
3391	Medical Equipment & Supplies Mfg	20.7%	6.9%	10.3%	3.0%	$0	77.6%	0
3399	Other Miscellaneous Manufacturing	12.1%	-11.8%	15.8%	3.0%	$2,700,000	77.6%	0

Appendix B: Advanced Manufacturing Subsectors

NAICS Code	NAICS Description
32411	Petroleum Refineries
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, & Artificial Synthetic Fibers & Filaments Manufacturing
3253	Pesticide, Fertilizer, & Other Agricultural Chemical Manufacturing
3254	Pharmaceutical & Medicine Manufacturing
3255	Paint, Coating, & Adhesive Manufacturing
3256	Soap, Cleaning Compound, & Toilet Preparation Manufacturing
3259	Other Chemical Product & Preparation Manufacturing
332992	Small Arms Ammunition Manufacturing
332993	Ammunition (except Small Arms) Manufacturing
332994	Small Arms Manufacturing
332995	Other Ordnance & Accessories Manufacturing
3331	Agriculture, Construction, & Mining Machinery Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial & Service Industry Machinery Manufacturing
3336	Engine, Turbine, & Power Transmission Equipment Manufacturing
3339	Other General Purpose Machinery Manufacturing
3341	Computer & Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio & Video Equipment Manufacturing
3344	Semiconductor & Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical, & Control Instruments Manufacturing
3346	Manufacturing & Reproducing Magnetic & Optical Media
3353	Electrical Equipment Manufacturing
33599	All Other Electrical Equipment & Component Manufacturing
3361	Motor Vehicle Manufacturing
3362	Motor Vehicle Body & Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product & Parts Manufacturing
3391	Medical Equipment & Supplies Manufacturing

Source: U.S. Department of Commerce, Office of Technology Policy